Limits and Discontinuity
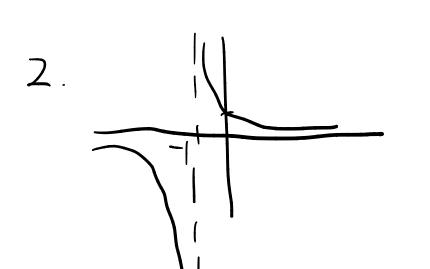
For which of the following should one use a one-sided limit? In each case, evaluate the one- or two-sided limit.

1. $\lim\limits_{x \to 0} \sqrt{x}$

2. $\lim\limits_{x \to -1} \dfrac{1}{x+1}$

3. $\lim\limits_{x \to 1} \dfrac{1}{(x-1)^4}$

4. $\lim\limits_{x \to 0} |\sin x|$

5. $\lim\limits_{x \to 0} \dfrac{|x|}{x}$

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1. $\lim\limits_{x \to 0^+} \sqrt{x} = 0$ one side

2.

$\lim\limits_{x \to -1^+} \dfrac{1}{x+1} = \infty$

$\lim\limits_{x \to -1^-} \dfrac{1}{x+1} = -\infty$

3. $\dfrac{1}{(x-1)^2}$ $\lim\limits_{x \to 1} \dfrac{1}{(x-1)^4}$

$\dfrac{1}{(x-1)^4}$ $= \infty$

4. $\lim\limits_{x \to 0} |\sin x|$

$= 0$

5. $\lim\limits_{x \to 0^+} \dfrac{x}{x} = 1$

$\lim\limits_{x \to 0^-} \dfrac{-x}{x} = -1$